

### REMARKS

In the Official Action, the Examiner raised a question concerning the term "butyl phthalyl", and rejected claims 1-4 and 12-16 relying on published European Patent Application No. 1 053 999 and particularly the description of certain phenols therein. The Examiner only objected to claims 5-11 and indicated that such claims would be allowable if rewritten in independent form.

Addressing the points raised in the Action in the order in which they have been presented, applicants note that the term "butyl phthalyl" has not been located in a chemical dictionary. The compound "butyl phthalate" is a known compound, as can be seen from the attached excerpt from the Condensed Chemical Dictionary, which refers attention to the entry for "dibutyl phthalate" with such entry also being provided. Dibutyl phthalate is already disclosed in the same paragraph on page 98 of the specification. Therefore, in the interest of clarity, the term "butyl phthalyl" has been canceled and such cancellation does not raise any question of new matter.

Turning to the rejections raised in the Action, the Examiner's finding of allowability of claims 5-11 is based on the absence of any teaching or suggestion of certain defined phenol compounds in the cited prior art. Based on this finding, each of claims 5-11 has been placed in independent form which should result in the allowance of such claims. In addition, claim 1 has been amended to include the phenols of formulas (III) and (IV) from claim 2, compounds which are also believed to be neither taught nor suggested by the cited prior art. Claims 2-4 and 12-16 have been canceled without prejudice or disclaimer. Finally, new independent claims 17-22 have been added. Claim 17 follows the format of claim 1, but defines phenol


compounds D-1 to D-12 (as disclosed on pages 69-70 of the specification), while claims 18-22 follow the format of original claim 16, but recite the phenols as defined in amended claim 1 and claims 5-8. Hence, such new claims should also be allowable over the cited prior art.

Since all matters raised in the Official Action are believed to be fully met by the present Amendment, applicants respectfully request reconsideration and allowance of the present application.

Should the Examiner wish to discuss any aspect of the present application, she is invited to contact the undersigned attorney at the number provided below.

Respectfully submitted,

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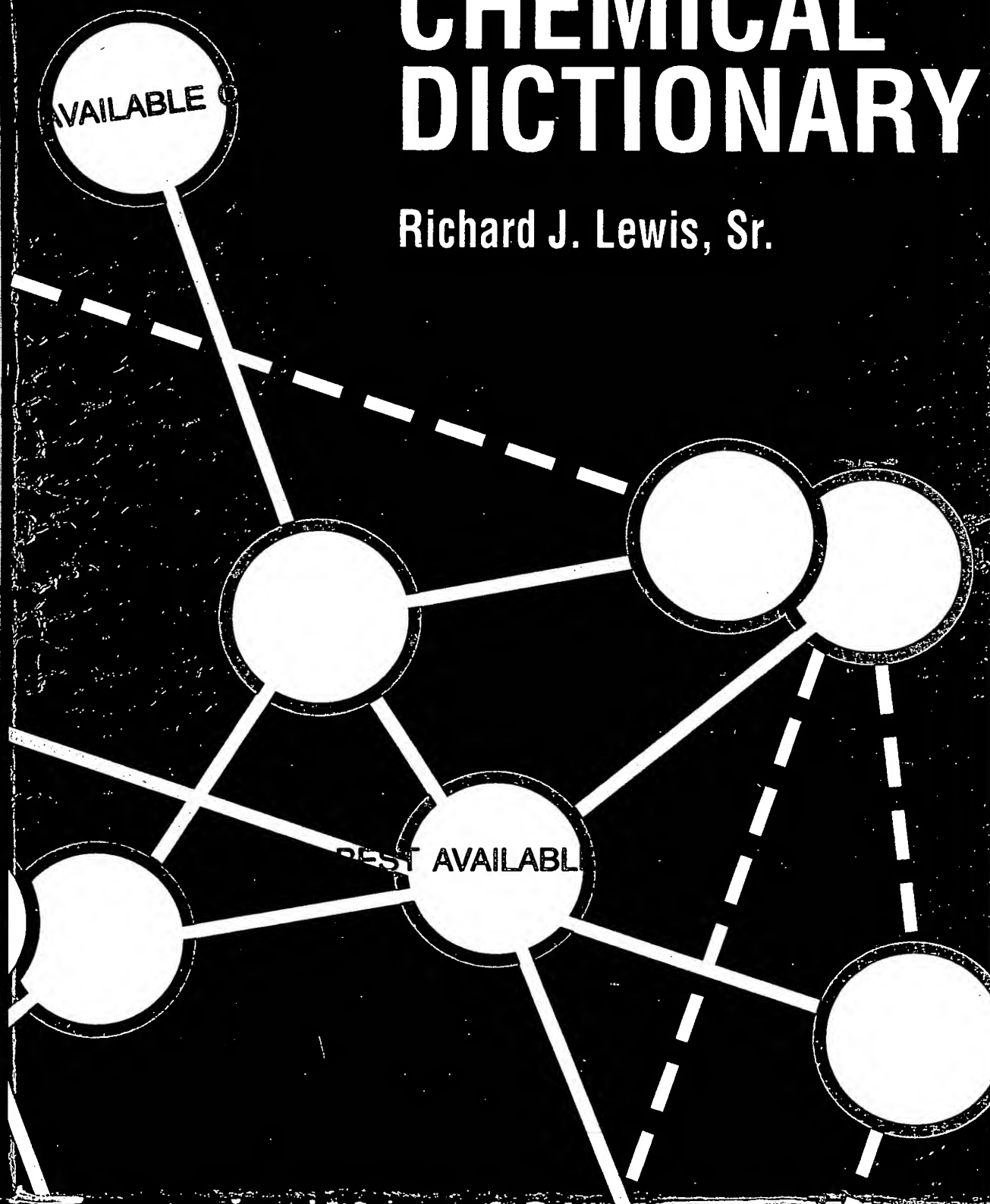
Date: June 16, 2004

*Hawley's*

Twelfth Edition

# CONDENSED CHEMICAL DICTIONARY

Richard J. Lewis, Sr.



*Hawley's*  
*Condensed Chemical*  
*Dictionary*

*TWELFTH EDITION*

*Revised by*  
Richard J. Lewis, Sr.

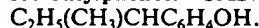


VAN NOSTRAND REINHOLD COMPANY  
New York

**BEST AVAILABLE COPY**

**tert-butyl perphthalic acid.** See tert-butyl peroxyphthalic acid.

**o-sec-butylphenol.** CAS: 89-72-5.



Properties: A slightly volatile liquid. Mw 150.22, bp 226–228C, flash p 225F, d 0.891. Insoluble in water, slightly soluble in alcohol, ether, and alkalies. Combustible.

Hazard: TLV: 5 ppm. Skin and eye irritant.

Use: Chemical intermediate in preparation of resins, plasticizers, surface-active agents.

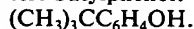
**o-tert-butylphenol.**  $(\text{CH}_3)_3\text{CC}_6\text{H}_4\text{OH}.$

Properties: Light yellow liquid, fp –7C, d 0.982 (20C), bp 224C, flash p 230F (110C) (OC). Soluble in isopentane, toluene, and ethanol; insoluble in water. Combustible.

Hazard: Toxic by ingestion, moderate irritant to eyes and skin.

Use: Chemical intermediate for synthetic resins, plasticizers, surface-active agents, perfumes, and other products. A permissible antioxidant for aviation gasoline (ASTM D910-64T).

**p-tert-butylphenol.** CAS: 98-54-4.



Properties: White crystals with a distinctive odor, d (crystals) 1.03, d (molten) 0.908 (114/4C), bp 239C, mp 100C. Combustible. Insoluble in water, soluble in alcohol and ether.

Derivation: Catalytic alkylation of phenol with olefins.

Hazard: Irritant to eyes and skin.

Use: Plasticizer for cellulose acetate; intermediate for antioxidants, special starches, oil-soluble phenolic resins; pour-point depressors and emulsion breakers for petroleum oils and some plastics; synthetic lubricants; insecticides; industrial odorants; motor-oil additives.

**n-butylphenyl acetate.**  $\text{C}_4\text{H}_9\text{OOCCH}_2\text{C}_6\text{H}_5.$

Properties: Colorless liquid with rose-honey odor, d 0.991–0.994 (25/25C), bp 135–141C (18 mm Hg), refr index 1.488–1.490 (20C). Soluble in 2 volumes 80% alcohol. Combustible. Made synthetically.

Grade: 98% min.

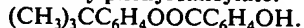
Use: Perfumes, flavoring.

**n-butylphenyl ether.**  $\text{C}_4\text{H}_9\text{OC}_6\text{H}_5.$

Properties: Liquid, d 0.929 (20C), boiling range 202–212C, water-white, aromatic odor, flash p 180F (82C). Combustible.

Hazard: Toxic by ingestion.

**4-tert-butylphenyl salicylate.**



Properties: Off-white, odorless crystals, mp 62–

64C, soluble in alcohol, ethyl acetate, toluene, insoluble in water.

Use: Light-absorber, best at 2900–3300 Å.

**n-butylphosphoric acid.** See n-butyl acid phosphate.

**n-butyl phthalate.** See dibutyl phthalate.

**butylphthalylbutyl glycolate.**



Properties: Colorless, odorless liquid; d 1.093–1.103 (25/25C); bp 219C (5 mm Hg); solidifies below –35C; darkens on heating above 290C; flash p 390F (199C) (OC). Combustible. Insoluble in water, extremely light-stable.

Use: Plasticizer for polyvinyl chloride. FDA approved for use in vinyl food wrappings.

**n-butyl phthalyl-n-butyl glycolate.** See “Morflex 190” [Morflex].

**n-butyl propionate.** CAS: 590-01-2.



Properties: Water-white liquid, apple-like odor, soluble in alcohol and ether, miscible with all coal tar and petroleum distillates, very slightly soluble in water. D 0.875 (20C), 0.874 (15.5C), wt/gal 7.3 lb, bp 146C (commercial grades boil over a range of 130–150C due to presence of butyl alcohol and esters), fp –89C, flash p 90F (32.2C), autoign temperature 800F (426C).

Derivation: Esterification of propionic acid with butyl alcohol and sulfuric acid catalyst.

Grade: Technical (85–90% to 95% ester content).

Hazard: Skin and eye irritant. Flammable, moderate fire risk.

Use: Solvent for nitrocellulose, retarder in lacquer thinner, ingredient of perfumes, flavors.

**butyl ricinoleate.**  $\text{C}_{17}\text{H}_{32}(\text{OH})\text{COOC}_4\text{H}_9.$

Properties: Yellow to colorless oleaginous liquid, soluble in alcohol and ether, insoluble in water, d 0.916 (20/20C), bp approximately 275C (13 mm Hg), flash p 220F (104.4C). Saybolt viscosity 112 (100F), fp indefinite, slightly opaque at –30C, and very viscous at –50C, wt/gal 7.62 lb (20C). Combustible.

Derivation: Castor oil and butyl alcohol.

Use: Plasticizer, lubricant.

**butyl rubber.** A copolymer of isobutylene (97%) and isoprene (3%). Polymerized below –95C with aluminum chloride catalyst.

Properties: D 0.92. Vulcanizates have tensile strength up to 2000 psi (unreinforced) and 3000 psi (reinforced). Service temperature range –55 to +204C. Good abrasion resistance, excellent impermeability to gases, high dielectric constant, excellent resistance to aging and sunlight, superior shock-absorbing and vibration-damp-

ing quality fair. Will Grade: Statomer, low Use: Tire cords and cation; and other reservoir ing, textil mulations ing cem tire-cord

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**butyl sorbat**  
tractant f

**n-butylstan**

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**butyl steara**

Properties (20/20C). flash p 43 Use: Plast sis of ins maceutic.

**butyl steara**

$\text{C}_{17}\text{H}_{35}\text{CO}$   
Properties solidifyin odorless, 0.855–0.8 320F (160 (20C), re ble with icohol and Derivation tion of st Grade: Te Use: Ingr and coat and mol solvent; rubber h cable lac

line (satisfies ASTM D910-64T as antioxidant in aviation gasoline), prevents decomposition of tetraethyl lead in gasoline.

**dibutylphenyl phosphate.** (DBPP; phosphoric acid, dibutyl phenyl ester). CAS: 2528-36-1.  $C_{14}H_{23}PO_4$ .

Properties: Clear liquid with butanolic odor, mw 286.26, sp g 0.0691 (23/25C), bp 131-132C, vap press 0.007 mm Hg at 25C, flash p 129C, insoluble in water.

Hazard: Combustible. TLV: 0.3 ppm in air.  
Use: Hydraulic fluids.

**dibutyl phosphate.** (di-n-butyl phosphate). CAS: 107-66-4.

Properties: Pale amber liquid, mw 210.21, mp (decomposes above 100C), vap press < 1 mm Hg at 20C.

Hazard: TLV: 1 ppm. Respiratory-tract irritant.  
Use: Organic catalyst and antifoaming agent.

**dibutyl phosphite.** CAS: 1809-19-4.  $(C_4H_9O)_2PHO$ .

Properties: Water-white liquid, bp 95C (1 mm Hg), d 0.9860 (25C), refr index 1.4228 (25C), flash p 120F (49C), soluble in common organic solvents. Combustible.

Hazard: Moderate fire risk.  
Use: Solvent, antioxidant, intermediate.

**dibutyl phthalate.** CAS: 84-74-2.

$C_6H_4(COOC_4H_9)_2$ .  
Properties: Colorless, odorless, stable, oily liquid; d 1.0484 (20/20C); fp -35C; viscosity 0.203 poise (20C); distillation range 227-235 (37 mm Hg); flash p (COC) 340F (171C); wt/gal 8.72 lb (20C); refr index 1.4915 (25C); bp 340.0C; vap press 1.11 mm Hg (150C); miscible with common organic solvents; insoluble in water. Combustible, autoign temperature approximately 750F (398.8C).

Derivation: By treating n-butyl alcohol with phthalic anhydride followed by purification, which results in a product unusually free from odor and color.

Grade: Technical, 99-100% dibutyl phthalate.

Hazard: Toxic. TLV: 5 mg/m<sup>3</sup> of air.

Use: Plasticizer in nitrocellulose lacquers, elastomers, explosives, nail polish, and solid rocket propellants; solvent for perfume oils; perfume fixative; textile lubricating agent; safety glass; insecticides; printing inks; resin solvent; paper coatings; adhesives; insect repellent for textiles.

**2,5-di-tert-butylquinone.**  $[C(CH_3)_3]_2C_6H_2O_2$ .

Properties: Yellow powder; mp 149-151C; insoluble in water; soluble in alcohol, acetone, ethyl acetate, and benzene.

Hazard: Fire risk in contact with organic materials.

Use: Oxidizing agent.

**dibutylsebacate.** (DBS).

$C_4H_9OCO(CH_2)_8OCOC_4H_9$ .

Properties: Clear, colorless, odorless liquid; bp 349C (760 mm Hg), 180C (3 mm Hg); fp -11C; d 0.936 (20/20C); wt/gal 7.81 lb (20C); refr index 1.4395 (25C); flash p 350F (176C). Insoluble in water. Combustible.

Grade: Technical.

Use: Plasticizer, rubber softener, dielectric liquid, cosmetics and perfumes, sealing food containers, flavoring.

**N,N-dibutylstearamide.**  $C_{17}H_{35}CON(C_4H_9)_2$ .

Properties: Yellow liquid, d 0.860 (20/20C), boiling range 173-175C (0.4 mm Hg), flash p 420F (215C), fatty-acid odor. Combustible.

**di-n-butyl succinate.**  $C_{12}H_{22}O_4$ .

Properties: Colorless liquid, bp 120C, fp -29C, d 0.977, refr index 1.43.

Derivation: Reaction of butyl alcohol with succinic acid.

Use: Insect repellent.

**di-tert-butyl sulfide.** (butyl sulfide).

$[(CH_3)_3C]_2S$ .

Properties: Liquid, fp -11C, boiling range 297-303F, d 0.8316, wt/gal 6.93 lb, refr index 1.451 (20C), flash p 125F (51.6C). Combustible.

Hazard: Moderate fire risk.

Use: Intermediate, flavoring.

**dibutyl tartrate.**

$C_4H_9OOCCH_2OCH_2OCOC_4H_9$ .

Properties: Light tan liquid, mp 21C, bp approximately 204C (26 mm Hg), refr index 1.4463 (20C), flash p 195F (90.5C) (CC), combustible, autoign temperature 544F (284.4C), wt/gal 9.07 lb (20C). Miscible with the common organic solvents, oils, hydrocarbons.

Use: Solvent and plasticizer for cellulose esters and ethers, elastomers, lubricant; rubberized fabrics; lacquers; dopes; transfer inks.

**dibutylthiourea.**  $C_4H_9NHCSNHC_4H_9$ .

Properties: White to light tan powder; mp 59-69C; slightly soluble in water; soluble in methanol, ether, acetone, benzene, ethyl acetate; insoluble in gasoline.

Use: Corrosion inhibitor, for pickling cast iron or carbon steel, reducing corrosion of ferrous metals and aluminum alloys in brine, intermediate.

**dibutyltinbis(lauryl) mercaptide.**

$(C_4H_9)_2Sn(SC_{12}H_{25})_2$ .

Yellow liquid, tin content 18.5%, soluble in toluene and heptane.

Hazard: T  
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tive) agen

**dibutyltin di**  
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Derivation:  
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Hazard: TI  
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foams.

**dibutyltin di**  
 $(C_4H_9)_2Sn$   
Properties:  
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Hazard: TI  
skin absor  
Use: Stabili  
mers; catal

**dibutyltin m:**  
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